

RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-3

Name: Sport Fish Investigations of Alaska.

Study No.: G-IV

Study Title: Creel Census Studies.

Job No.: G-IV-C

Job Title: Creel Census of the Sport Fisheries
in the Bristol Bay Drainage.

Period Covered: July 1, 1970 to June 30, 1971.

ABSTRACT

A weighted, stratified random creel census program was used to estimate the Naknek River king salmon, Oncorhynchus tshawytscha, sport catch. The expanded creel census data indicates an estimated sport catch of 2,730 king salmon. Military fishermen accounted for 96.7% of the total catch.

Biological data was collected from 162 sport-caught king salmon during the creel census program. Age 1.2 and 1.3 king salmon comprised 72.0% of the catch.

A statistically designed creel census program was initiated primarily for rainbow trout, Salmo gairdneri, on the upper Naknek River. This design provided a minimal catch estimate of 875 rainbow trout. Fork lengths were measured from 62 rainbow trout and ages determined from 53 legible scales.

An estimated sport catch of 2,832 red salmon, O. nerka, indicates this species is the second most important sport fish in the Naknek River.

Due to lack of objective data for both Dolly Varden, Salvelinus malma, and coho salmon, O. kisutch, these fisheries were not assessed.

Voluntary creel census reports supplied from the three recreational military facilities, Lake Camp, Rapids Camp, and Base Dock, were tabulated and discussed. The estimated number of angler days spent at these facilities was 4,421.

Angling trend estimates in Bristol Bay were established by writing letters and personally contacting fishing guides, charter services, bear hunters, bear guides, and fishing lodge operators.

RECOMMENDATIONS

Continue the weighted, stratified random creel census program on the Naknek River during the king salmon sport fishery and further expand the statistical creel census activities during other periods to include the rainbow trout, silver salmon, and Dolly Varden sport fisheries.

Continue tabulating the voluntary creel census reports from the Alaska Air Command recreation camps on the Naknek River.

Creel census activities in the Ugashik and Wood River Lakes systems should be continued and expanded within the limits of time and manpower and be conducted by statistical design.

Continue contacting guides, charter pilots, and lodge operators for creel census information to evaluate trends in sport fishing effort.

Conduct an economic evaluation of the sport fisheries as part of all creel census programs in the Bristol Bay area.

Continue conducting creel census activities in the Kvichak watershed under Job G-11-E.

OBJECTIVES

1. To determine the extent and impact of angling pressures on the sport fish resources in specific recreational areas.
2. To determine and provide recommendations for future investigations and management of the study area waters.

TECHNIQUES USED

Voluntary creel census reports from the military recreational facilities were received and tabulated to supplement the Department creel census program. The number of anglers at the Lake and Rapids camps was multiplied by four, which is the average number of days a guest stayed. Angler utilization of the King Salmon Air Force Station dock was estimated from boat rental receipts, using a season average of 2.3 anglers per boat rental. Voluntary military reports were expanded to acquire a more reliable catch estimate. By expanding the reported species catches by the percentage of reporting anglers, as shown on the voluntary reports, to the total estimated angler days, the estimated total catch is derived.

A direct creel census program using a weighted, stratified random sampling design was conducted by Sport Fish Division personnel during the

king salmon sport fishery on the Naknek River. The sampling design was weighted according to the king salmon landings by dock and time strata, as determined from the 1969 creel census data, which was taken by an unweighted, stratified random program (Paddock, 1969). The weighting factors by dock were as follows: Rapids Camp, 61%; King Salmon Air Force Station, 33%; and the public access dock located near the Federal Aviation Administration area, 6%. A total of 41 hourly sampling periods were conducted each week. The sampling periods were randomly distributed, after weighting, in all three six-hour strata, beginning at 6 AM and ending at 12 PM. The Lake Camp dock was not included in this program because anglers using this facility docked their boats at the Rapids Camp during the king salmon season.

Following the king salmon closure, a similar creel census program was carried out by Sport Fish Division personnel monitoring the upper Naknek River rainbow trout sport fishery. A weighted, stratified random program was conducted at the military recreational facilities as work load and personnel permitted. Of the 31 hourly sampling periods allotted each week, 50% were allocated to the Rapids Camp, 40% to the Lake Camp, and 10% to the King Salmon Air Force Station dock. Additional weighting factors were applied to the two program strata (1200-1800 hours and 1800-2400 hours), with 40% and 60% of the sampling periods allotted to each strata respectively.

Expanding the creel census data is a function of multiplying the recorded catches by a constant factor of seven to obtain an estimate of catch for a seven-day angling week.

Length data and scale samples were collected from the king salmon and rainbow trout catch. Standard fork length was measured to the nearest millimeter.

The European method of age designation was used for king salmon, and direct annuli counts were used to designate rainbow trout age.

Age determinations were derived from scale impressions. The scale samples were impressed on 0.02-inch thick cellulose acetate and were read using a microprojector.

Angling effort information was obtained from guides, charter services, and lodge operators by correspondence and personal contact.

FINDINGS

Naknek River

Military Reports:

Voluntary creel census reports from the military recreational facilities were tabulated and summarized in Tables 1 through 4. Variations in

TABLE 1 Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Rapids Camp, Naknek River, 1970.

		Fishing Periods						
		6/ 8 - <u>14</u>	6/15 - <u>21</u>	6/22 - <u>28</u>	6/29 - <u>7/ 5</u>	7/ 6 - <u>12</u>	7/13 - <u>19</u>	7/20 - <u>26</u>
Anglers reporting		37	115	270	228	189	66	25
Total hours		119.0	591.0	1,561.5	1,353.0	1,125.5	242.0	161.0
Catch composition:								
34	Rainbow trout	52	10	40	21	33	25	7
	Arctic grayling	7	13	3	2	12	49	16
	King salmon	-	112	294	269	228	-	-
	Red salmon	-	-	1	128	45	291	63
	Coho salmon	-	-	-	-	-	-	-
	Pink salmon	-	-	-	-	1	-	-
	Chum salmon	-	-	-	2	1	-	-
	Dolly Varden	1	-	-	3	1	-	-
	Lake trout	-	1	-	2	-	5	-
	Whitefish	-	-	4	2	-	3	2
Northern Pike		-	-	3	1	-	-	-
Total		60	136	345	430	321	373	88
Catch/hr.		0.50	0.23	0.22	0.32	0.29	1.54	0.55

TABLE I (Cont.) Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Rapids Camp, Naknek River, 1970.

	Fishing Periods				Tot.	% of Total Catch
	<u>7/27 - 8/ 2</u>	<u>8/ 3 - 9</u>	<u>8/10 - 16</u>	<u>8/17 - 23*</u>		
Anglers reporting	4	24	39	2	999	
Total hours	10.0	108.0	257.0	6.0	5,534.0	
Catch composition:						
Rainbow trout	6	11	11	-	216	11.7
Arctic grayling	-	1	4	-	107	5.8
King salmon	-	-	-	-	903	49.0
Red salmon	-	-	-	-	528	28.6
Coho salmon	-	1	26	-	27	1.5
Pink salmon	-	1	12	-	14	0.8
Chum salmon	-	-	-	-	3	0.2
Dolly Varden	1	11	4	-	21	1.1
Lake trout	-	1	-	-	9	0.5
Whitefish	-	-	-	-	11	0.6
Northern pike	-	-	-	-	4	0.2
Total	7	26	57	0	1,843	100.0
Catch/hr.	0.70	0.24	0.22	0.00	0.33	

*Camp closed on 8/17.

TABLE 2 Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Lake Camp, Naknek River, 1970.

	Fishing Periods								
	6/ 8 - 14	6/15 - 21	6/22 - 28	6/29 - 7/ 5	7/ 6 - 12	7/13 - 19	7/20 - 26	7/27 - 8/ 2	8/ 3 - 9
Anglers reporting	69	114	82	111	124	181	60	58	39
Total hours	284.5	395.0	418.5	670.5	550.0	747.0	318.0	310.0	162.0
Catch composition:									
Rainbow trout	170	127	107	63	26	34	16	54	81
Arctic grayling	6	2	13	13	6	2	-	9	11
King salmon	-	17	19	81	93	-	-	-	-
Red salmon	-	-	-	174	316	727	450	177	37
Coho salmon	-	-	-	-	-	-	-	-	-
Pink salmon	-	-	-	-	-	-	-	-	-
Chum salmon	-	-	-	-	-	-	-	-	-
Dolly Varden	-	1	4	-	1	-	1	-	2
Lake trout	-	-	2	-	-	-	-	-	2
Whitefish	-	-	2	9	2	2	3	-	1
Northern pike	-	-	2	-	-	-	-	9	-
Total	176	147	149	340	444	765	470	249	134
Catch/hr.	0.62	0.37	0.36	0.51	0.81	1.02	1.48	0.80	0.83

TABLE 2 (Cont.) Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Lake Camp, Naknek River, 1970.

	Fishing Periods					Tot.	% of Total Catch
	8/10 - 16	8/17 - 23	8/24 - 30	8/31 - 9/ 6	9/ 7 - 13*		
Anglers reporting	23	38	70	63	27	1,059	
Total hours	105.0	281.5	520.0	359.5	104.0	5,225.5	
Catch composition:							
Rainbow trout	12	25	23	80	35	853	26.4
Arctic grayling	2	4	13	-	1	82	2.5
King salmon	-	-	-	-	-	210	6.5
Red salmon	10	-	-	-	-	1,891	58.6
Coho salmon	2	11	16	7	5	41	1.3
Pink salmon	-	46	50	-	-	96	3.0
Chum salmon	-	-	-	-	-	0	0.0
Dolly Varden	2	-	6	-	-	17	0.5
Lake trout	1	-	-	-	-	5	0.2
Whitefish	-	1	-	-	-	20	0.6
Northern pike	1	2	-	-	-	14	0.4
Total	30	89	108	87	41	3,229	100.0
Catch/hr.	0.29	0.32	0.21	0.24	0.39	0.62	

*Camp closed on 9/13.

TABLE 3 Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Base Dock, Naknek River, 1970.

	Fishing Periods					
	5/11 - 17	5/18 - 24	5/25 - 31	6/ 1 - 7	6/ 8 - 14	6/15 - 21
Anglers reporting	19	3	3	19	79	79
Total hours	32.0	6.0	4.0	33.5	189.5	280.0
Catch composition:						
Rainbow trout	8	7	-	-	5	1
Arctic grayling	-	2	2	-	-	-
King salmon	-	-	-	3	17	46
Red salmon	-	-	-	-	-	1
Coho salmon	-	-	-	-	-	-
Pink salmon	-	-	-	-	-	-
Chum salmon	-	-	-	-	-	-
Dolly Varden	6	-	-	-	-	-
Lake trout	-	-	-	-	-	-
Whitefish	-	-	-	-	-	-
Northern pike	-	-	-	-	-	-
Total	14	9	2	3	22	48
Catch/hr.	0.44	1.50	0.50	0.09	0.12	0.17

TABLE 3 (Cont.) Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Base Dock, Naknek River, 1970.

	Fishing Periods				Tot.	% of Total Catch
	6/22 - 28	6/29 - 7/ 5	7/ 6 - 12	7/13 - 19*		
Anglers reporting	89	58	8	5	362	
Total hours	371.5	218.5	36.0	18.0	1,189.0	
Catch composition:						
Rainbow trout	2	-	-	-	23	11.7
Arctic grayling	-	-	-	-	4	2.0
King salmon	40	36	10	-	152	77.6
Red salmon	-	2	-	7	10	5.1
Coho salmon	-	-	-	-	-	0.0
Pink salmon	-	-	-	-	-	0.0
Chum salmon	-	-	-	-	-	0.0
Dolly Varden	-	-	-	-	6	3.1
Lake trout	1	-	-	-	1	0.5
Whitefish	-	-	-	-	-	0.0
Northern pike	-	-	-	-	-	0.0
Total	43	38	10	7	196	100.0
Catch/hr.	0.12	0.17	0.28	0.39	0.16	

*No reports after 7/13; camp was open by request after this date until October.

TABLE 4 Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Lake Camp, Rapids Camp, and Base Dock, Naknek River, 1970.

	Fishing Periods						
	5/11 - 17*	5/18 - 24	5/25 - 31	6/ 1 - 7	6/ 8 - 14**&***	6/15 - 21	6/22 - 28
Anglers reporting	19	3	3	19	185	308	441
Total hours	32.0	6.0	4.0	33.5	593.0	1,266.0	2,351.5
Catch composition:							
Rainbow trout	8	7	-	-	227	138	149
Arctic grayling	-	2	2	-	13	15	16
King salmon	-	-	-	3	17	175	353
Red salmon	-	-	-	-	-	1	1
Coho salmon	-	-	-	-	-	-	-
Pink salmon	-	-	-	-	-	-	-
Chum salmon	-	-	-	-	-	-	-
Dolly Varden	6	-	-	-	1	1	4
Lake trout	-	-	-	-	-	1	3
Whitefish	-	-	-	-	-	-	6
Northern pike	-	-	-	-	-	-	5
Total	14	9	2	3	258	331	537
Catch/hr.	0.44	1.50	0.50	0.09	0.44	0.26	0.23

TABLE 4 (Cont.) Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Lake Camp, Rapids Camp, and Base Dock, Naknek River, 1970.

	Fishing Periods						
	6/29 - 7/ 5	7/ 6 - 12	7/13 - 19*	7/20 - 26	7/27 - 8/ 2	8/ 3 - 9	8/10 - 16
Anglers reporting	397	321	252	85	62	63	62
Total hours	2,242.0	1,711.5	1,007.0	479.0	320.0	270.0	362.0
Catch composition:							
Rainbow trout	84	59	59	23	60	92	23
Arctic grayling	15	18	51	16	9	12	6
King salmon	386	331	-	-	-	-	-
Red salmon	304	361	1,025	513	177	37	10
Coho salmon	-	-	-	-	-	1	28
Pink salmon	-	1	-	-	-	1	12
Chum salmon	2	1	-	-	-	-	-
Dolly Varden	3	2	-	1	1	13	6
Lake trout	2	-	5	-	-	3	1
Whitefish	11	2	5	5	-	1	-
Northern pike	1	-	-	-	9	-	1
Total	808	775	1,145	558	256	160	87
Catch/hr.	0.36	0.45	1.14	1.16	0.80	0.59	0.24

TABLE 4 (Cont.) Weekly Angling Effort and Catch Composition from Voluntary Creel Census Reports at Lake Camp, Rapids Camp, and Base Dock, Naknek River, 1970.

	Fishing Periods				Tot.	% of Total Catch
	8/17 - 23**	8/24 - 30	8/31 - 9/ 6	9/ 7 - 13***		
Anglers reporting	40	70	63	27	2,420	
Total hours	287.5	520.0	359.5	104.0	11,948.5	
Catch composition:						
Rainbow trout	25	23	80	35	1,092	20.7
Arctic grayling	4	13	-	1	193	3.7
King salmon	-	-	-	-	1,265	24.0
Red salmon	-	-	-	-	2,429	46.1
Coho salmon	11	16	7	5	68	1.3
Pink salmon	46	50	-	-	110	2.1
Chum salmon	-	-	-	-	3	0.1
Dolly Varden	-	6	-	-	44	0.8
Lake trout	-	-	-	-	15	0.3
Whitefish	1	-	-	-	31	0.6
Northern pike	2	-	-	-	18	0.3
Total	89	108	87	41	5,268	100.0
Catch/hr.	0.31	0.21	0.24	0.39	0.44	

*Base Dock opened on 5/16 and closed on 7/13; opened by request after 7/13 until October.

**Rapids Camp opened on 6/8 and closed on 8/17.

***Lake Camp opened on 6/8 and closed on 9/13.

the total catch composition by camp can be attributed primarily to the physical location of the camp and to camp-enforced restrictions. The validity of these voluntary reports for anything other than general trend information has been discussed at length by Paddock (1969;1970).

The total number of angler days contributed by the military camps was estimated at 4,421. Table 5 indicates the angling pressure by military recreational camps has consistently decreased since 1967.

TABLE 5 Military Fishing Effort as Indicated by Lake and Rapids Camps Utilization and Boat Rentals, from Base Dock, Naknek River, 1967-1970.

<u>Facility</u>	<u>Estimated Angler Days</u>			
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
Base Dock	1,293	1,495	1,140	1,589
Rapids Camp	2,916	2,252	2,672	1,520
Lake Camp	3,951	3,096	1,740	1,312
Total	8,160	6,843	5,552	4,421

The voluntary military creel census reports provide a more reliable catch estimate when expanded to compensate for fishermen failing to fill out their catch report (see Techniques). The expanded catch estimate is shown in Table 6 and is 12.8% less than the estimated Departmental mean of 2,640 (see section on king salmon).

TABLE 6 Total Military Catch of King Salmon as Estimated from Voluntary Creel Census Reports, Naknek River, 1970.

	<u>Est. Angler Days</u>	<u>No. Reported Angler Days</u>	<u>% Reporting</u>	<u>Kings Reported</u>	<u>Expanded Catch</u>
Rapids Camp	1,520	999	65.7	903	1,374
Lake Camp	1,312	1,059	80.7	210	260
Base Dock	1,589	362	22.8	152	667
Total	4,421	2,420	--	1,265	2,301

King Salmon:

A weighted, stratified random creel census program was conducted on the Naknek River during the king salmon, Oncorhynchus tshawytscha, fishery, which closed on July 12. Subsequent analysis of the sampling design indicates that the use of a previous year's catch by dock and time strata yields usable weighting factors (Table 7).

TABLE 7 Analysis of the King Salmon Creel Census Sampling Design, Naknek River, 1969-1970.

<u>Dock and Strata*</u>	<u>1969</u>	<u>1970</u>	
	<u>% Kings Landed</u>	<u>% Samples</u>	<u>% Landings</u>
Rapids Camp			
Strata I	17.3	21.8	3.2
Strata II	47.1	47.3	58.2
Strata III	<u>35.5</u>	<u>30.9</u>	<u>38.6</u>
Total	(63.6)	(61.1)	(73.1)
Base Dock			
Strata I	7.3	8.3	0.0
Strata II	37.9	38.3	29.3
Strata III	<u>54.8</u>	<u>53.3</u>	<u>70.7</u>
Total	(32.5)	(33.3)	(23.6)
F.A.A. Dock			
Strata I	10.0	0.0	0.0
Strata II	45.0	50.0	76.9
Strata III	<u>45.0</u>	<u>50.0</u>	<u>23.1</u>
Total	(3.9)	(5.6)	(3.3)
*Strata I - 0600 to 1200 hours			
Strata II - 1200 to 1800 hours			
Strata III - 1800 to 2400 hours			

Expanding the creel census data indicates an estimated 2,730 king salmon were taken in the sport fishery (Table 8). An estimated 0.14 fish was caught per angler hour. Military effort accounted for 96.7% of the 2,639 king salmon landed.

TABLE 8 Weekly King Salmon Creel Census Summary by Dock, Naknek River, 1970.

		Expanded Estimates		
		No. Angler Contacts	No. Angler Hrs.	No. King Salmon Landed
6/ 7-13:	Rapids	168	546.00	0
	Base	98	266.00	35
	F.A.A.	<u>35</u>	<u>129.50</u>	<u>7</u>
	Total	301	941.50	42
6/14-20:	Rapids	189	812.00	147
	Base	210	621.25	28
	F.A.A.	<u>0</u>	<u>0.00</u>	<u>0</u>
	Total	399	1,433.25	175
6/21-27:	Rapids	658	3,388.00	343
	Base	462	2,087.75	259
	F.A.A.	<u>42</u>	<u>119.00</u>	<u>14</u>
	Total	1,162	5,594.75	616
6/28-7/ 4:	Rapids	644	2,733.50	413
	Base	462	1,834.00	210
	F.A.A.	<u>49</u>	<u>161.00</u>	<u>49</u>
	Total	1,155	4,728.50	672
7/ 5-11:	Rapids	1,036	6,125.00	1,092
	Base	196	749.00	112
	F.A.A.	<u>28</u>	<u>119.00</u>	<u>21</u>
	Total	1,260	6,993.00	1,225
Season Total		4,277	19,691.00	2,730

A comparison of the 1969 and 1970 data indicates the number of king salmon taken decreased and the catch per unit of effort increased. The estimated catch for 1969 was 4,631 king salmon with a catch per unit of effort of 0.10, while in 1970 the mean estimated catch was 2,730 with a catch per unit of effort of 0.14 (Paddock, 1969). This variation is attributed to normal fluctuations in the king salmon population and to weather conditions during the 1970 season which limited sport fishing. Data obtained prior to 1969 is of questionable comparative value since the weighted, stratified creel census program was implemented. During the June 7 to July 12 period, the major angling effort is directed toward king salmon, with catches of other species incidental to this effort (Table 9).

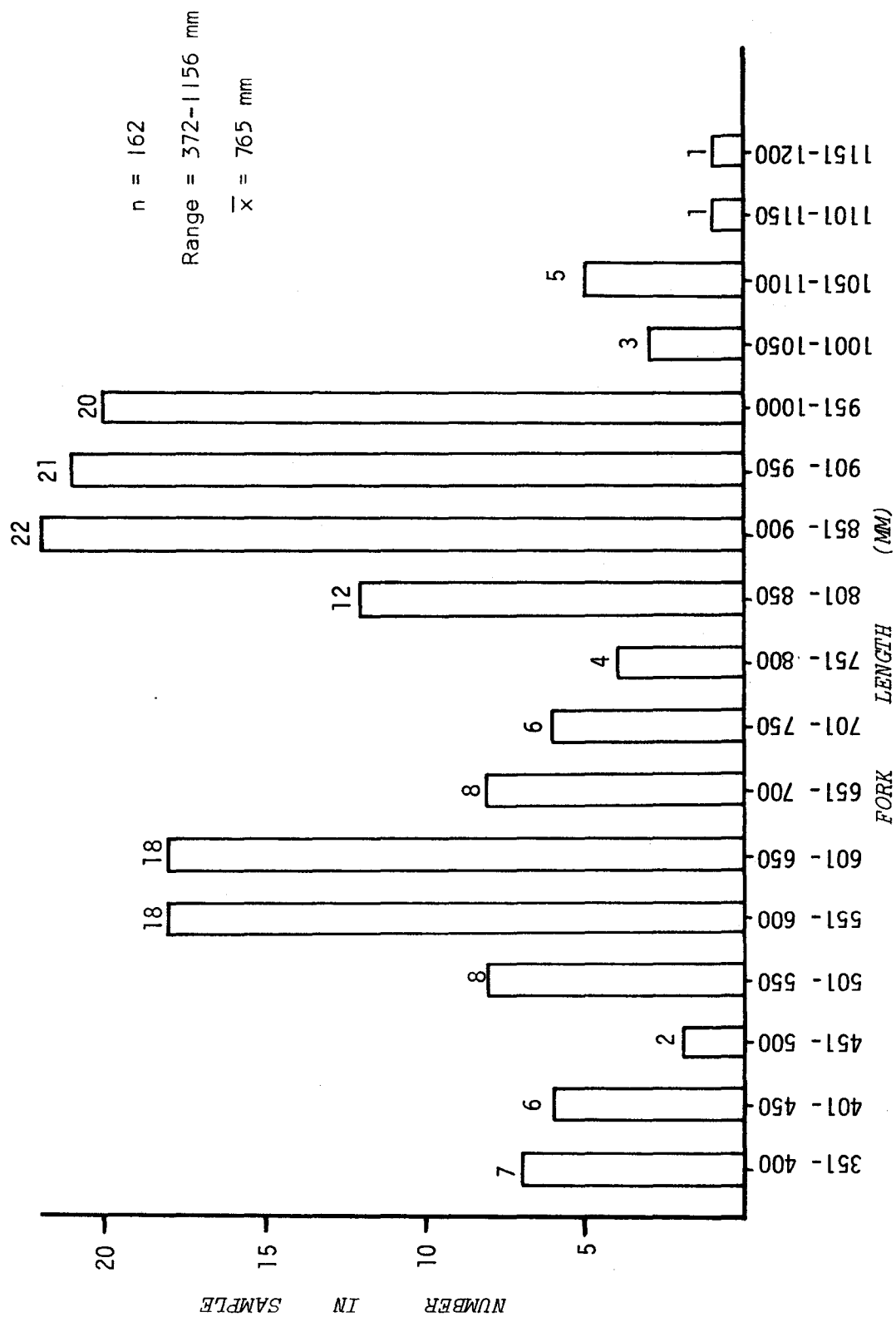


FIGURE 1 LENGTH-FREQUENCY OF SPORT-CAUGHT KING SALMON, NAKNEK RIVER, 1970.

TABLE 9 Expanded Estimate of Catch Composition, Naknek River Creel Census, 1970.

Weekly Period	Catch Composition*							Tot. Catch
	<u>KS</u>	<u>RT</u>	<u>GR</u>	<u>DV</u>	<u>RS</u>	<u>CS</u>	<u>NP</u>	
6/ 7-6/13	42	119	14	7	-	-	-	182
6/14-6/20	175	-	-	-	-	-	-	175
6/21-6/27	616	56	7	-	-	7	-	686
6/28-7/ 4	672	49	7	-	70	63	21	882
7/ 5-7/11	<u>1,225</u>	<u>49</u>	<u>-</u>	<u>7</u>	<u>81</u>	<u>-</u>	<u>-</u>	<u>1,362</u>
Tot. Est. Catch	2,730	273	28	14	151	70	21	3,287
% Tot. Catch	83.1	8.3	0.9	0.4	4.6	2.1	0.6	100.0
*KS - King Salmon DV - Dolly Varden NP - Northern Pike RT - Rainbow Trout RS - Red Salmon GR - Arctic Grayling CS - Chum Salmon								

Biological data was collected from 162 sport-caught king salmon during the creel census program. The sample fish ranged in length from 372 - 1,156 mm, with a mean standard fork length of 765 mm and a standard deviation of 189.9 mm. Figure 1 illustrates the length-frequency of the sample.

Age determinations were made on 150 sport-caught king salmon (Figure 2). The majority of the catch (72.0%) was composed of age classes 1.2 and 1.3.

Rainbow Trout and Red Salmon:

Following the king salmon closure on July 12, the fishery is characteristically directed toward rainbow trout, Salmo gairdneri, and red salmon, O. nerka, with red salmon dominating the catch. A statistically designed creel census program was initiated to monitor this fishery.

Because of unexpected variation in the operation of the recreational camps and personnel limitations placed on the program by other projects, modifications of the program design were required, which resulted in fewer samples taken at the Lake and Rapids camps. The King Salmon Air Force Station dock was closed during the majority of periods sampled.

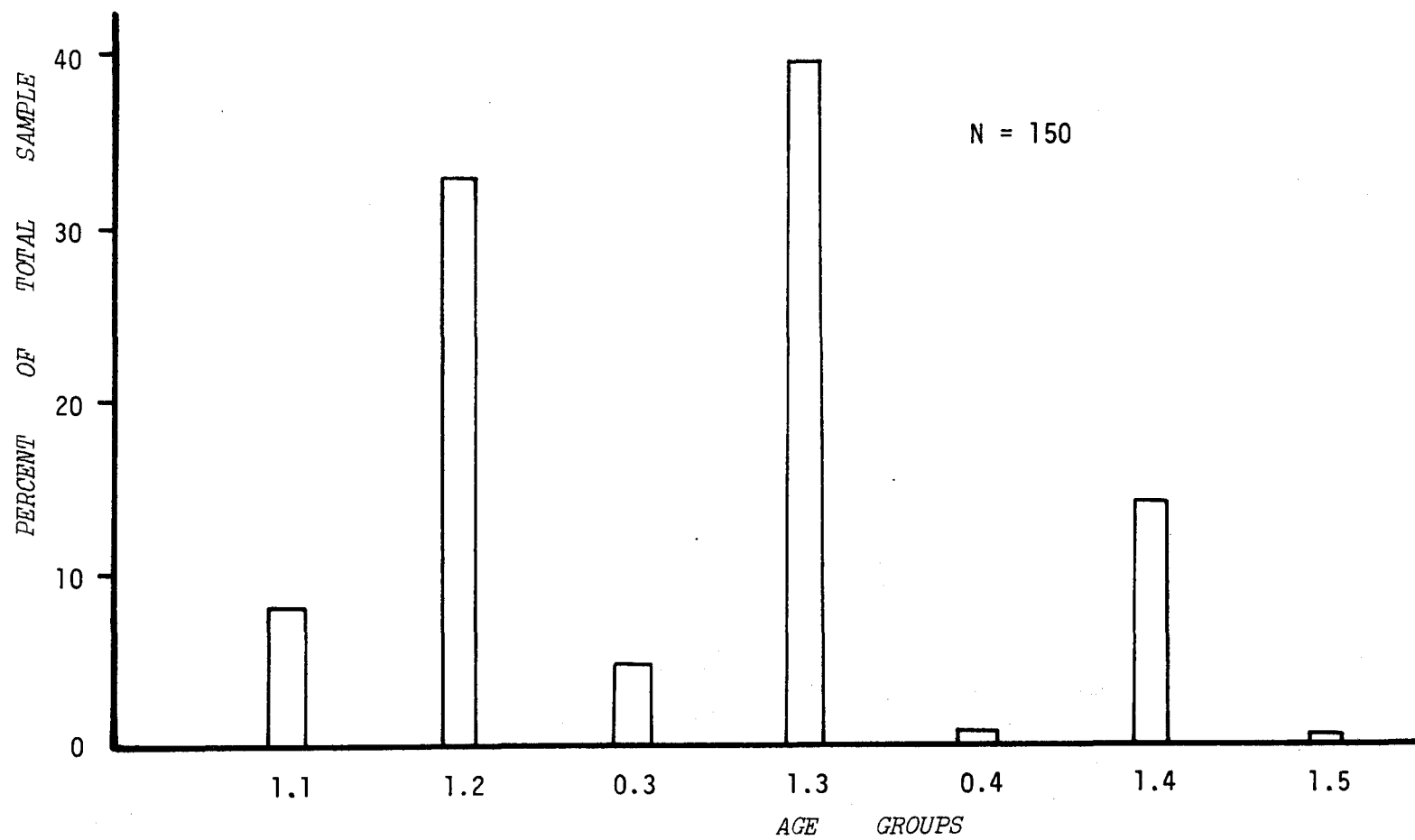


FIGURE 2 KING SALMON CATCH COMPOSITION BY EUROPEAN AGE DESIGNATION, NAKNEK RIVER, 1970.

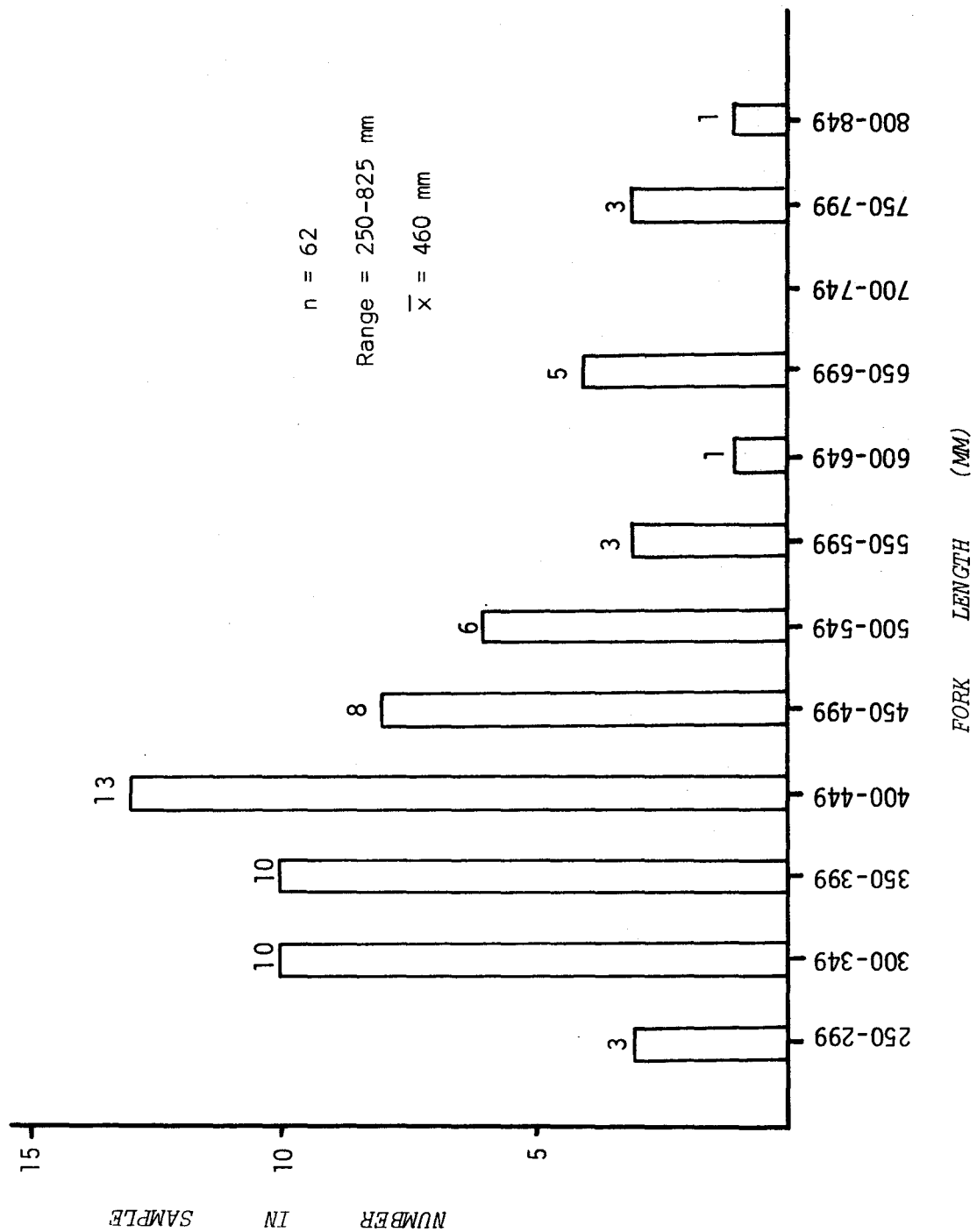


FIGURE 3 LENGTH-FREQUENCY OF SPORT-CAUGHT RAINBOW TROUT, NAKNEK RIVER, 1970.

During the period July 12 to August 8, an estimated 602 rainbow trout were taken in the sport catch. An estimated 273 were taken incidental to the king salmon sport fishery for an estimated season total of 875 rainbow trout. This does not include the early spring rainbow trout fishery at the outlet of Naknek Lake for which minimal information is available.

Review of the voluntary military creel census reports (see previous section) indicates a reported rainbow trout catch of 1,092 which, because of incomplete reporting, should be considered a minimal estimate. This indicates an inadequate number of samples were taken during the Department's creel census program.

By extrapolating the reported military rainbow trout catch, the following expanded catches can be assumed:

Lake Camp	1,353
Rapids Camp	329
Base Dock	<u>101</u>
Total	1,783

These expanded catches cover the period the military camps were operated and do not include the civilian catches. The late fall and early spring rainbow trout catches, especially in the upper Naknek River area, cannot be estimated except through a direct creel census program. The late fall fishery and the early spring fishery account for a substantial catch by both military and civilian anglers.

Sixty-two rainbow trout were sampled during the creel census program for age-length information. Figure 3 indicates the length-frequency of this sample. The sample range was 250 - 825 mm, with a mean standard fork length of 461 mm and a standard deviation of 132.2 mm.

Age determinations of 53 rainbow trout sampled during the creel census program were made (Figure 4). These data indicate 64.1% of the sport catch is composed of age III and IV fish.

Creel census data taken during and subsequent to the king salmon sport fishery indicates an estimated sport catch of 2,832 red salmon, which places this species second in importance in the sport fishery. Extrapolation of voluntary creel census reports, as done by Paddock, indicates a red salmon sport catch of 3,191. The Commercial Fisheries Division estimated a total escapement of 732,502 red salmon in the Naknek River drainage.

Other Species:

Lack of objective data for both the Dolly Varden, Salvelinus malma, and silver salmon, O. kisutch, sport fisheries makes it difficult to assess the angling impact or trends. Previous reports of these fisheries have

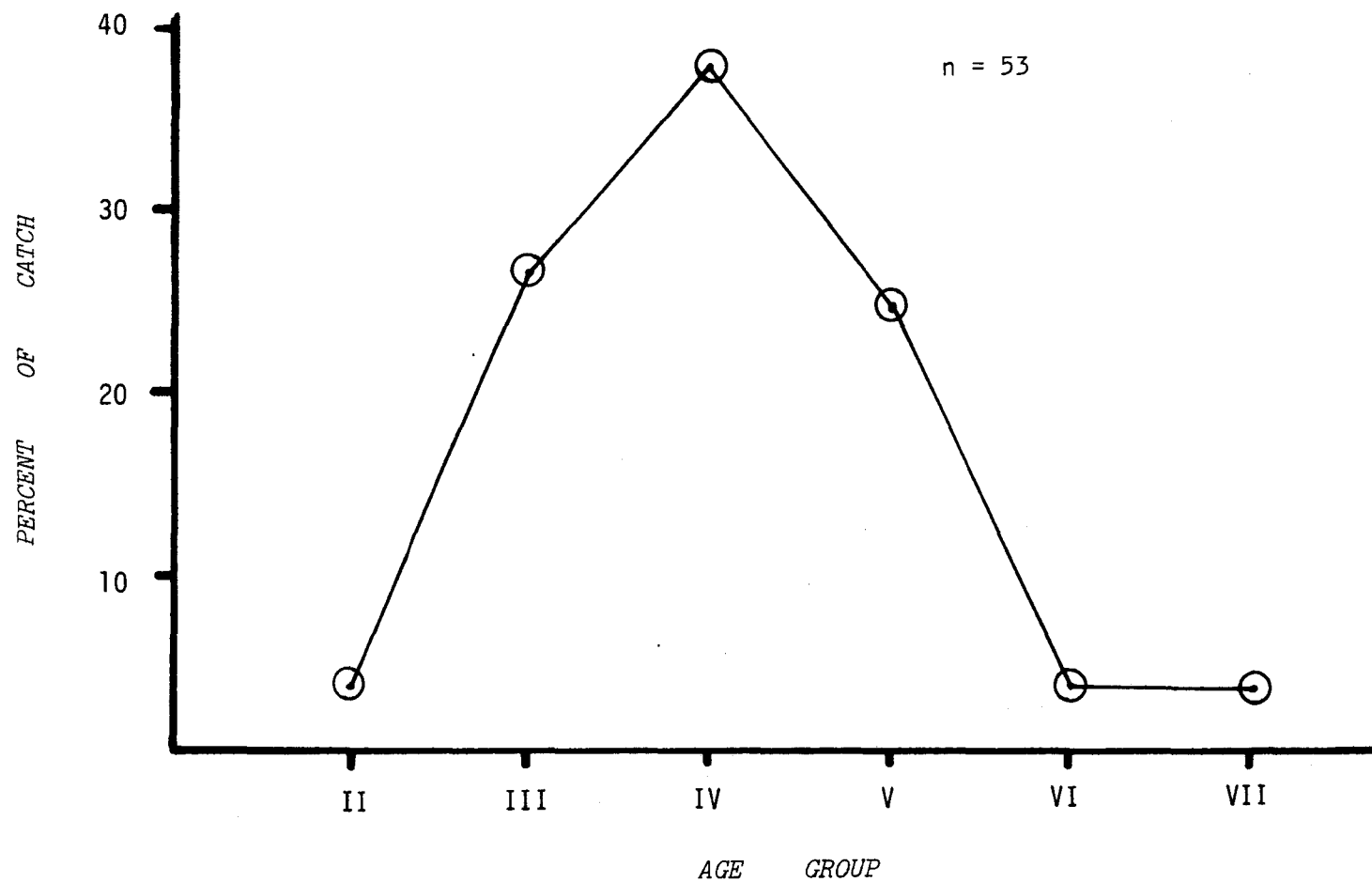


FIGURE 4 RAINBOW TROUT CATCH COMPOSITION BY SCALE ANNULI COUNTS, NAKNEK RIVER, 1970.

been based primarily on scattered reports and observations. It is hoped that future work loads can be adjusted so that objective data can be compiled for these sport fisheries.

Other Fishing Pressures

This year letters were again written, and personal contacts were made with fishing guides, charter services, bear hunters, bear guides, and fishing lodge operators to estimate angling trends in Bristol Bay. The professional fishing guides maintained a full schedule, while the lodge facilities, which handle a larger number of guests, experienced a decrease. This situation can possibly be attributed to the economic situation and the type of people served.

Bear hunters and guides primarily fish the Becharof and Ugashik Lake areas as the majority of the bear camps are located in these areas. Their fishing effort is on Arctic grayling, Thymallus arcticus, and Dolly Varden.

There are flying services and airlines located in Anchorage, Alaska, offering charter flights into primarily Lake Iliamna areas. Some of these flights handle as many as 20 - 30 weekend fishermen a trip and are increasing each year.

Two new lodges were established during 1970 in Bristol Bay, which located camps in the Naknek, Alagnak (Branch), and Ugashik watersheds, plus two areas on Lake Clark.

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